



Malaria transmission pattern resilience to climatic variability is mediated by insecticide-treated nets

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Abstract:

BACKGROUND: Malaria is an important public-health problem in the archipelago of Vanuatu and climate has been hypothesized as important influence on transmission risk. Beginning in 1988, a major intervention using insecticide-treated bed nets (ITNs) was implemented in the country in an attempt to reduce Plasmodium transmission. To date, no study has addressed the impact of ITN intervention in Vanuatu, how it may have modified the burden of disease, and whether there were any changes in malaria incidence that might be related to climatic drivers. **METHODS and FINDINGS:** Monthly time series (January 1983 through December 1999) of confirmed Plasmodium falciparum and Plasmodium vivax infections in the archipelago were analysed. During this 17 year period, malaria dynamics underwent a major regime shift around May 1991, following the introduction of bed nets as a control strategy in the country. By February of 1994 disease incidence from both parasites was reduced by at least 50%, when at most 20% of the population at risk was covered by ITNs. Seasonal cycles, as expected, were strongly correlated with temperature patterns, while inter-annual cycles were associated with changes in precipitation. Following the bed net intervention, the influence of environmental drivers of malaria dynamics was reduced by 30-80% for climatic forces, and 33-54% for other factors. A time lag of about five months was observed for the qualitative change ("regime shift") between the two parasites, the change occurring first for P. falciparum. The latter might be explained by interspecific interactions between the two parasites within the human hosts and their distinct biology, since P. vivax can relapse after a primary infection. **CONCLUSION:** The Vanuatu ITN programme represents an excellent example of implementing an infectious disease control programme. The distribution was undertaken to cover a large, local proportion (approximately 80%) of people in villages where malaria was present. The successful coverage was possible because of the strategy for distribution of ITNs by prioritizing the free distribution to groups with restricted means for their acquisition, making the access to this resource equitable across the population. These results emphasize the need to implement infectious disease control programmes focusing on the most vulnerable populations.

Source: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2443810>

Resource Description

Exposure : ☐

weather or climate related pathway by which climate change affects health

Ecosystem Changes, Precipitation, Temperature, Other Exposure

Temperature: Fluctuations

Climate Change and Human Health Literature Portal

Other Exposure: sea surface temperature

Geographic Feature: 

resource focuses on specific type of geography

Ocean/Coastal, Tropical

Geographic Location: 

resource focuses on specific location

Non-United States

Non-United States: Australasia

Health Impact: 

specification of health effect or disease related to climate change exposure

Infectious Disease

Infectious Disease: Vectorborne Disease

Vectorborne Disease: Mosquito-borne Disease

Mosquito-borne Disease: Malaria

Intervention: 

strategy to prepare for or reduce the impact of climate change on health

A focus of content

Mitigation/Adaptation: 

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: 

type of model used or methodology development is a focus of resource

Outcome Change Prediction

Population of Concern: A focus of content

Resource Type: 

format or standard characteristic of resource

Research Article

Timescale: 

time period studied

Short-Term (